

David Embick

Roots and features (an acategorial postscript)*

David Embick: Department of Linguistics, 619 Williams Hall, University of Pennsylvania, Philadelphia, PA 19104-6305, U.S.A. E-mail: embick@ling.upenn.edu

1 Introduction

The idea that natural languages possess a set of *lexical categories* is inherited from earlier descriptive and theoretical paradigms. As is the case with every other such inheritance, contemporary theories make explicit claims concerning what role (if any) these proposed categories play in the grammar as currently understood. It is thus appropriate to begin inquiry in this area by asking whether lexical categories as traditionally understood do real work in current grammatical theories. This is a real question: it is possible that rather than being an essential component of grammar, “lexical category” is instead a cover term used to refer to a set of grammatical phenomena whose correct analysis involves primitives and representations that have no obvious place in the prior (i.e. inherited) system.

Along these lines, one of the main themes that I will develop in this paper calls into question the utility of traditional ways of defining lexical categories. More specifically, it will be suggested that the questions that must be asked in this domain change when approached in a theory that holds that categories are nothing more than bundles of features, an idea that is assumed (but not always fully appreciated) in many current theories of grammar. Put simply, traditional questions about lexical categories and their universality must be recast, because current theories do not make use of lexical categories in the traditional sense.

Chung provides important steps towards a revised set of questions along these lines. While a certain part of Chung’s paper is directed at establishing the existence of (morphosyntactically, distributionally, etc.) distinct classes of *verbs*,

* I’m very happy to have the privilege of writing a commentary on this paper by Sandy Chung, whose work I have always admired for its insight, depth, breadth, and clarity.

nouns, and *adjectives* (call this Part I), she is sedate about this conclusion, and suggests that “. . . the demonstration leading up to it has the potential to be more broadly significant” (2012: 47) than the finding itself. This connects to the rest of her paper, where a main theoretical problem at the center of her analysis involves patterns of derivational morphology: in her terms, the question of *multifunctionality* of Chamorro Roots (this is part II). Significantly, the analysis presented in Part II relies on the idea that important generalizations about Chamorro are reflections of a universal theory of derivational morphology. In the type of theory that is used to explain such generalizations (see references below), the distinction between *Roots* and *functional morphemes* replaces the distinction between lexical and functional categories. The Roots are by definition acategorical, and thus bear little resemblance to the members of the traditional lexical categories. Among the functional morphemes, there is a subtype that categorizes Roots: these are called *category-defining heads*; by definition, varieties of *v*, *n*, and *a* that produce verbs, nouns, and adjectives. These category-defining functional heads are constitutively defined by features (and are not defined e.g. distributionally, or in terms of overt agreement patterns, etc.). It could be said that this theory either employs zero lexical categories, or one (i.e. the Root, although calling these a category might be misleading). In any case, the important point is that while Roots and category-defining heads do some of the work associated with lexical categories in other approaches, the theory does not make use of traditional lexical categories per se.

With these points in mind, there is a pseudo-tension between the two main components of Chung’s paper. On the one hand, she argues that Chamorro has nouns, verbs, and adjectives in the typical sense of lexical category (Part I); on the other hand, the proposals concerning multifunctionality (Part II) are implemented in terms of a theory that says that there are only Roots and functional morphemes, i.e., no lexical categories, in the specific sense that is touched on above.

The tension is not real, because Chung moves immediately past the arguments of Part I into the deep and difficult questions of Part II. My commentary follows a similar path, and presents a series of reflections on the different notions of category that are implicated in the different components of this discussion. After looking at what universalist claims about category might amount to in a theory that does not distinguish categories from features (§2), I turn to Chung’s observations about derivational morphology (*multifunctionality*) and her analysis of this phenomenon in §3. One important aspect of her analysis is based on apparent *lexical gaps* in derivation, an important issue in theoretical models like the particular Root-based model assumed here; the general issue is outlined in §4, which sketches some directions for further research. §5 concludes.

2 Lexical categories → Roots and features

The idea that there are no (traditional) lexical categories in the technical sense that is mentioned above is a specific instantiation of a larger theoretical position on the nature of grammatical features. In the view that I will develop here, this connects with a further theory of how features are bundled into morphemes, the terminal nodes of syntactic derivations. The idea that grammatical categories are feature bundles is not novel; it is a primary proposal of Chomsky (1970). The background to Chomsky's paper involves a tension between some different ways of defining lexical categories. One of these is a "traditional" view which defines categories in terms of distributional classes. Another is the treatment of lexical categories as complexes of features. For reasons that are too complex to go into here, the argument of Chomsky (1970) is that the latter notion of category is the one that is essential for stating grammatical generalizations. A consequence of viewing categories as complexes of features is that there really is no notion of (lexical) category that is distinct from what is provided by the decomposition of categories into features; that is, it is possible to "... eliminate the distinction of feature and category, and regard all symbols of the grammar as sets of features" (1970: 208).

In a theory that treats categories in this way, generalizations are to be explained in terms of features, and the use of features like $[\pm V]$ and $[\pm N]$ is one such proposal along these lines. Although this feature system is familiar because of its connections with traditional grammar, it was recognized early on that these features might be too superficial, and that grammatical categories could very well be a "... reflection of a deeper feature structure ... of a more abstract sort" (Chomsky 1970: 35). That is, it could be discovered that generalizations across traditional categories require features that do not always map neatly onto verbs, nouns and adjectives, so that the feature inventory would have to be modified accordingly. On the other hand, to the extent that generalizations do seem to cluster in a way that looks a lot like the traditional system of nouns, verbs, and adjectives, then the conclusion that can be drawn from this is that familiar features for categories are good enough *for at least some purposes*. This latter point connects with Chung's Part I, as will be discussed below, where it will also be asked exactly how useful the "three category" reduction really is.

In the theory assumed here, a version of Distributed Morphology (e.g. Embick and Marantz (2008) and Embick (2010)), both category-defining functional heads like *v*, *n*, etc., and non-category-defining morphemes are feature bundles. Thus, one member of a category such as *tense* is the past tense morpheme $[+T, +past]$, while e.g. members of the category *verb* involves a *v* head (e.g. $[+v]$ or its equivalent) along with some other features. A notational convention

privileges the label of a category, so that we might see e.g. T[+past] as the representation of a past tense morpheme, or *v* for a verb, but this shorthand does not affect the main claim of this type theory, which is that all categories are defined featurally.

Within a theory that treats categories in this way, the proposal that all languages have nouns, verbs, and adjectives can be understood in terms of the following two claims: first, languages select from a universal set of features, call this the *universal feature inventory*; and second, while some features might be found in some language and not others, this is not the case with *v*, *n*, and *a*. Strictly speaking, the second claim should be formulated more precisely, so that it says that all languages have morphemes with [+*v*], [+*n*], and [+*a*] features, or their equivalent if a more abstract decomposition is required.

Chung's argument that Chamorro has nouns, verbs, and adjectives can be interpreted in light of these observations.

It is important to note that the arguments in Part I are not directed exclusively at the sort of inherent feature content discussed above. Rather, it is shown that there are some diagnostics – whether semantic, syntactic, or morphological – that can be used to break up Chamorro words into three classes that are called *nouns*, *verbs*, and *adjectives*. Chung does this in a careful and convincing way; and she is at pains to point out that the fact that Chamorro is like other languages in this way is not surprising (2012: 47). Whether surprising or not, this conclusion can be examined further in light of the idea that categories are features, with particular emphasis to be placed on what kind of universal we might be dealing with.

A first point is that the claim that the categories verb, noun, and adjective are universal in the sense used immediately above is *coarse*-grained. The coarseness is to be found in the fact that it would be possible to keep identifying more and more lexical categories using distributional and morphosyntactic diagnostics, so that, at least according to one way of speaking, there would be a great deal of difference in the categories found in different languages. For example, consider the fact that verbs in Chinantecan and Algonquian languages are sensitive to whether or not their internal arguments are animate, whereas e.g. Mapudungun and Classical Greek and English verbs are not (Foris 2000; Mithun 1999; Salas 1992). This facet of the former languages has consequences for verbal morphology, making “animate verbs” and “inanimate verbs” different. Thus, based on the kinds of (morphosyntactic) diagnostics that could be used to show that e.g. verbs and adjectives are distinct in some language, it might also be said that the former languages have the lexical category “animate verb” that the latter do not. That is: at a coarse level of granularity, it could be said that all of these languages have verbs, since, presumably all of these languages have elements that share enough properties to

be considered similarly verbal, in spite of other differences among subtypes. At the same time, it might be said at a finer level of granularity that English and Classical Greek and Mapudungun and Chinantecan languages do not all possess the same lexical categories.

In practice, it is more common to adopt the coarse grain that privileges three lexical categories (as in Chung's paper), so that all of these languages have a category of "verbs". However, it should be clear from these points that the choice to ignore certain details when making universal claims about category is in part a matter of convenience. As far as I can see, saying that all languages have the same three lexical categories might very well be correct (using coarse-grained, morphosyntactic criteria); but, this is a very general claim, and does little actual explanatory work in the theory. This is because (among other things) (i) the decision of where to stop identifying new categories on distributional and morphosyntactic grounds is relatively arbitrary; and (ii) it still remains to be explained why various criteria (selectional, morphosyntactic, etc.) can be used to converge on "the same" set of categories cross-linguistically.

The substantive component of the universal theory of categories enters the picture when we move away from distributional and morphosyntactic criteria, and focus instead on the featural composition of category-defining morphemes. In my view, both of the points raised at the end of the last paragraph are addressed directly in a theory that seeks universals in the primitive building blocks of syntax (features, packaged into morphemes), and not in derivative properties. In such a theory, the universalist questions about categories concern the extent to which languages are the same or different in terms of the features and morphemes they employ. These particular questions about the morphemes that make up the lexical categories – category-defining heads in the view assumed here – are thus part of a larger theory directed at the identification of the basic building blocks of grammar.

Research on questions of this type has advanced in some areas; for example, in the study of number. Differences in feature combinations can be used to explain why e.g. Mapudungun and Classical Greek have a dual number in addition to singular in plural, while English does not; and so on (e.g. Noyer (1992); Harbour (2008)). The same could be said of Tense, Person, and a number of other categories that are typically called inflectional, where it appears that many languages make distinctions (terminologically: have *active* features) that are not active in other languages. When such differences in active features are found across languages, it is not (or should not be) concluded that there is no universal theory of the morpheme and its contents. Rather, the basic universal position is the one alluded to above: viz., that there is a universal feature inventory from which languages construct morphemes, so that there are substantive (i.e. inventory-related)

universals in this domain.¹ This approach to features and their combination into morphemes has obvious connections with phonological theory, where languages show some differences in what features they use, and how they are packaged. In this light, the claim that all languages have verbs, nouns and adjectives looks like e.g. the idea that all languages are the same in having both consonants in vowels, whatever differences they may have show.²

While some progress has been made in identifying inventory-differences in the domains mentioned above, the extent to which such variation is found with category-defining heads is not at all clear at this point. A complicating factor is that many cross-linguistic differences might be reduced to other domains, not to the category-defining heads themselves. For example, with respect to the phenomenon mentioned above (animacy in verbs), it is conceivable that both the animacy-sensitive and animacy-insensitive types of languages have exactly the same types of *v* morphemes, with differences in agreement being a superficial (i.e. morphological, or PF) difference.³ Perhaps a clearer example of what it would mean to have a cross-linguistic difference in *v* heads is found in the analysis of different types of ergative case marking in Legate (2008); it is argued there that some ergative languages have an ergative-assigning *v* that assigns accusative, whereas others have an ergative-assigning *v* that does not. This is an example of a (morphosyntactic) difference between types of languages that is reduced to a difference in the types of *v*-morphemes that are present in each.

As difficult as they seem to be, questions like those raised in the last paragraph are still relatively accessible, because they are connected closely to syntactic and interface properties (such as case and agreement) that have been intensely

1 As Chomsky (1965) puts it “The question of substantive representation in the case of the grammatical formatives and the category symbols is, in effect, the traditional question of universal grammar (1965: 65).”

The claim of universality should be qualified to syntactic and semantically-interpreted features; the status of morphological diacritics (e.g. those that define systems of conjugation and declension, and perhaps features related to arbitrary gender) is potentially distinct. See Embick (in prep.) for some recent discussion.

2 Some evidently marginal categories can be thought of in these terms. Suppose, for example, that it turned out to be true that some languages failed to have “adjectives”. This would show that while some morphemes (those that define nouns and verbs) are indispensable in natural language, others – the adjective forming morphemes – are not. This could be similar to the discovery that e.g. while all languages have consonants and vowels, and most languages make (contrastive) use of nasal consonants, others do not (Maddieson 2011).

3 Even though the two types would differ in terms of there being animacy associated with nouns, something that may implicate the universal theory of features.

studied.⁴ Things become more difficult when inquiry is made into central questions in derivational morphology, and the features that make different types of v , n , etc., since a number of additional issues (interaction of functional heads with Root-semantics; competition for semantic space; etc.) must be taken into account. See §§3–4 below for additional comments on derivation.

In summary, the line of research that arises from the Root-and-feature based theory is centered on the idea that languages draw from a restricted set of features, so that it should be possible to identify a core of category-defining morphemes that is shared by all languages. The number of universal morphemes might grow when functional morphemes that are not category-defining are considered (e.g. it is typically assumed that all languages have finite Tense morphemes, and so on). Familiar arguments about categories (i.e. those based on distribution, morphosyntactic properties, etc.) play a role in this line of research, because these properties are often indirect reflections of feature content; but the ultimate theoretical focus must be on a reduction to features bundled into morphemes if the points developed in this section are on the right track.⁵

3 Chamorro *multifunctionality* in derivational morphology

Part II of Chung's paper is centered on the observation that Chamorro shows a number of derivations in which the same Root may appear as a member of more than one category in more than one way: "Verbs and adjectives can be derived from nouns by conversion; verbs and adjectives can also be created from roots that are used separately to create nouns" (2012: 46). That is, members of "lexical category" x can be formed either by attaching x to a Root categorized by y to yield $[[\sqrt{\text{ROOT}} y] x]$, or x can categorize the Root directly to produce $[\sqrt{\text{ROOT}} x]$. In (1)

⁴ For example, in connection with the idea that cross-linguistic differences are restricted to the lexicon; e.g. Chomsky (1993) and related work.

⁵ Beyond features and morphemes, there are additional questions concerning how to explain the apparent restriction of selectional relations. To take a specific example, if it turns out to be the case that only verbs (i.e. v) elements are associated with the introduction of true *Agent* thematic relations, then this must be because there is some feature (e.g., [+ag]) that occurs only with v (or because there is some other morpheme, e.g. Voice, that introduces *Agent* relations, and this head selects only v , not members of other categories). But what would an explanation for this restriction on [+ag]/Voice look like?

this is illustrated with simple (Root-attached) verbs (1a) and verbs derived from nouns (1b):

- (1) Two type of verbs
- a. Simple (“Root”) Verb: [$\sqrt{\text{ROOT}} v$]
 - b. Denominal Verb: [$[\sqrt{\text{ROOT}} n] v$]

Chung’s conclusion in Part II is that Chamorro is like other languages in how Roots appear in different types of derivations. In particular, the same Root may appear in multiple contexts: Roots that often appear as nouns (merged with *n*) or adjectives (merged with *a*) can be merged directly with *v* to form verbs; verbs can also be formed from nouns ($[[\sqrt{\text{ROOT}} n] v]$), and so on. She argues that having Roots surface in multiple categories is not evidence for an “unusual” category system (as is perhaps held by some earlier works on the language that she cites). Rather, her arguments suggest a strong universal theory of derivational morphology; after comparing her Chamorro findings with patterns found in languages like English, she concludes that Chamorro shows “. . . just what we expect if lexical categories are universal, and the broad routes by which semantic and phonological material can be packaged into lexical categories are universal as well.” (2012: 46). These points are significant and straightforward; in fact, the position that is being objected to here is extremely obscure to me, and I will have nothing to say about it.

While developing the points outlined above, Chung’s analysis connects with a number of important theoretical topics, including but not limited to the relationship between Roots to the contexts in which they appear; the idea that derivational morphemes can attach either to an uncategorized Root or to a Root that has already been categorized; the idea that the pronunciations of different Roots plus category-defining heads may sometimes be homophonous (part of the theory of syncretism); and the appearance of *lexical gaps* in certain conceivable derivations.

The last of these points is of particular interest from the point of view of a theory like the one assumed here. Chung uses lexical gaps to argue that Chamorro is like English and other languages. The examples of lexical gaps that she adduces are of nouns that are expected to be verbalizable (*baina* ‘sheath’ and *håyu* ‘stick’), but which are shown in (57) with *’s; a connection is made with English denominal verb formation, illustrated with *bottle the wine* and *pot the plants* versus **cup the milk* and **vase the flowers*. Beyond what they show about similarities between English and Chamorro, the reason to focus on gaps (real or apparent) is that in some current theories of derivational morphology – especially those that employ cyclic derivation (recent versions in Marantz 2007, 2010;

Embick 2010) – it is not possible for an outer derivational morpheme x to see the Root in a category-changing derivation in which x attaches outside of inner category-defining y . Thus, apparent lexical gaps of this type raise important questions for such theories, because truly “lexical” interactions, in which the identity of the Root is visible to an outer category-changing morpheme, are not expected to occur.

The rest of this section looks at the predictions that are at issue in the analysis of such gaps; questions for further research along these lines are then advanced in § 4.

As a preliminary, I will outline some of the basics of the theory of derivational morphology that I assume here (see e.g. Marantz 2001, Embick and Marantz 2008, Embick 2010). As mentioned above, this theory holds that category-neutral Roots can be initially categorized by different types of category-defining functional heads v , n , and a . In this theory a basic “verb” is $[\sqrt{\text{ROOT}} v]$, a “noun” is $[\sqrt{\text{ROOT}} n]$, and so on. A general architectural premise of the theories mentioned above is that Roots and category-defining heads are combined syntactically. It can be assumed further that Roots have inherent semantic properties, and that these properties interact with category-defining heads to produce different patterns of distribution for different (classes of) Roots. How much variation there is in Root/category-defining head relations cross-linguistically is an important question, but one which I am not able to address here.

As mentioned above with respect to (1), category-defining heads can appear as the first categorizer of a Root (1a), or they can be attached outside of other category-changing heads (as in (1b)). In the former instance, the Root-attached head categorizes the Root, and is said to be in the *inner* domain. In the latter case, true *category-changing* occurs; this produces e.g. verbs formed from nouns ($[[\sqrt{\text{ROOT}} n] v]$), adjectives formed from verbs ($[[\sqrt{\text{ROOT}} v] a]$), etc. As mentioned earlier, a morpheme that changes category in this way – i.e., one that is not the closest to the Root – is an *outer* categorizing morpheme.

In terms imported from another descriptive/analytical tradition, Chung calls the type of category-changing derivation that she studies in Chamorro an instance of *conversion*. This term is typically used to describe category-changing derivations in which there are no overt derivational morphemes. In a Root-based theory like the one that I assume here, there is no principled syntactic difference between derivations that involve overt exponents and those that do not, so that there is nothing particularly special about conversion (although the zero- or non-realization of certain morphemes might be important when certain types of morphophonological locality are considered; Embick 2003, 2010). There is a practical issue with conversion, because when category-defining heads are not overt, it is more difficult to determine whether a particular form involves Root

attachment or category-changing. But as a matter of theoretical principle, I will assume here that the crucial question about categorization is whether a category-defining head attaches directly to a Root or outside of another category-defining head, so that whether or not these morphemes have overt exponents will not be important.

The generalization that is relevant to the analysis of gaps is that category-defining heads that are attached outside of other category-defining heads like y in $[[\sqrt{\text{ROOT}} x] y]$ do not appear to be able to see the complement of x . In work that connects this effect to the theory of phases (Chomsky 1998, 1999), along the lines developed recently in Marantz (2008) and Embick (2010), this generalization is analyzed as a consequence of a cyclic derivation in which certain domains are inaccessible for later stages of computation. Category-defining heads play an extremely important role in this theory, because they are assumed to be cyclic (i.e., to define phases).

Without getting into details of implementation, the predictions that one particular theory of this type makes about outer heads seeing Roots is stated in a more general form as the ACTIVITY COROLLARY in Embick (2010):

- (2) ACTIVITY COROLLARY: In $[[\dots x] y]$, x , y both cyclic, material in the complement of x is not *active* in the PF cycle in which y is spelled out.

The consequences of this corollary can be seen in both the phonological and interpretive components. In the former, it is predicted that category-defining y cannot have its form determined via contextual allomorphy that refers to the identity of specific elements (like a Root) in the complement of x . On the semantic side, it is predicted that meanings of $[[\sqrt{\text{ROOT}} x] y]$ must be built off of meanings active for $[\sqrt{\text{ROOT}} x]$. This latter point, which is relevant to the issue of conversion and lexical gaps, requires further unpacking.

A Root is interpreted in the context of a category-defining morpheme x that categorizes it. On the assumption that there is sometimes polysemy in Root meanings, so that some Roots possess more than one related meaning, it can be assumed that there is a procedure ϕ that interprets Roots and the structures they appear in to produce a set of meanings $\{m_1 \dots m_n\}$. There are a number of (over)simplifications in this representation, with respect to exactly how polysemous meanings are related to each other, and what the limits of polysemy are. Moreover, an articulated theory of derivational morphology and Root meanings must take into account both (i) the grammatical aspects of meaning that come about from what $[\sqrt{\text{ROOT}} x]$ means “inherently”, versus (ii) the convention or use-related aspects of meaning that arise from “competition for semantic space”

(Embick and Marantz 2008). These complications are mostly put to the side here (although “semantic space” is invoked in the next section).⁶

When “category-changing” occurs $[[\sqrt{\text{ROOT}} x] y]$, the Activity Corollary says that y morpheme is not able to access any meanings associated with the Root beyond those in the set $\{m_1 \dots m_n\}$ that is produced when $[\sqrt{\text{ROOT}} x]$ is interpreted. Thus, y must work on meanings that were derived at the x stage; that is:

- (3) The interpretation of $[[\sqrt{\text{ROOT}} x] y]$ with category-changing x, y must be a function of ϕ at the y stage acting on one of the m_i meanings derived in the interpretation of $[\sqrt{\text{ROOT}} x]$.

Two parts of this warrant further comment.

Point 1: The first point is relevant when y is also able to attach directly to the same Root, so that there are two types of y -forms: $[\sqrt{\text{ROOT}} y]$ and $[[\sqrt{\text{ROOT}} x] y]$. This would be the case, for example, with nominal heads n , which can form simple nominals $[\sqrt{\text{ROOT}} n]$ (e.g. *marriage*) and gerundive nominals (with v inside of n) like *marrying*. The general prediction is this: suppose that one of the meanings in the interpretation of $[\sqrt{\text{ROOT}} y]$ – call it m' – is not part of $[\sqrt{\text{ROOT}} x]$. Then, the meaning m' cannot be active in $[[\sqrt{\text{ROOT}} x] y]$. The reason for this is that in category-changing $[[\sqrt{\text{ROOT}} x] y]$, the interpretation at the y stage is restricted to meanings that are activated with $[\sqrt{\text{ROOT}} x]$; that is, there is no direct or independent access to the Root at that stage, only to meanings activated when $[\sqrt{\text{ROOT}} x]$ is interpreted.

Point 2: It is specified in (3) that the interpretation of $[[\sqrt{\text{ROOT}} x] y]$ should be a *function* of y applying to one of the m -meanings of $[\sqrt{\text{ROOT}} x]$. This part is important because when y is interpreted with respect to the m -meanings of $[\sqrt{\text{ROOT}} x]$, it still sees and works on those meanings. So, for example, if none of the m -meanings is an appropriate input to the semantic operation executed at the y stage, then $[[\sqrt{\text{ROOT}} x] y]$ might be deviant. Or, it is possible that out of context, or absent some convention, there might not be a natural “semantic space” associated with the output of interpretation of y applied to the m -meanings of $[\sqrt{\text{ROOT}} x]$.

⁶ It must be assumed (with Marantz 2010) that the relevant m_i interpretations are restricted to Root-polysemy, not idiomaticity per se. At the same time, the dividing lines between polysemy and homophony are not always clear. E.g. *slug* can be used (as a noun) a type of gastropod, a bullet, a false coin for use in vending machines, a shot-sized gulp of liquid, etc. etc.; how many Roots $\sqrt{\text{SLUG}}$ are there?

In such a case, the form will evidently be deviant, even though it might be, strictly speaking, grammatical (see §4 below).

The first point is what ensures that in true *denominal verbs* – i.e. $[[\sqrt{\text{ROOT}} n] v]$, the meaning of the verb is built directly off of one of the nominal meanings; see, for example, the observations in Kiparsky (1997), and Root-based implementation in e.g. Arad (2005). The second point suggests that even when $[[\sqrt{\text{ROOT}} x] y]$ is expected for some types of Roots, there might be additional meaning-related factors at play in determining how acceptable the form actually sounds to speakers. This idea will play an important role in §4.

To summarize: one of Chung’s arguments for category-changing (“conversion”) in Chamorro is that Chamorro – like English – shows “arbitrary lexical gaps” in conversion. However, the theory of category-changing morphology outlined above says that the Root is never visible at the y cycle in $[[\sqrt{\text{ROOT}} x] y]$. Thus, if there are gaps in such derivations, the theory says that they cannot, strictly speaking, be gaps that require an outer category-defining morpheme y to see a specific Root in $[[\sqrt{\text{ROOT}} x] y]$. Rather, if this theory is correct then either the gap must be not be lexical (= Root-specific); or the deviance must arise for other reasons.

4 On “Gaps”

Elaborating on the last part of the previous section, there are roughly speaking two paths to explore in the analysis of category-changing gaps. Illustrating with denominal verbs, these are as follows:

- (E1) It could be that $[[\sqrt{\text{ROOT}} n] v]$ is unacceptable because the semantic function that v performs is not defined on any m_i from $[\sqrt{\text{ROOT}} n]$.
- (E2) It could be that $[[\sqrt{\text{ROOT}} n] v]$ is derived by the grammar across the board for the relevant type of nouns, but with particular nouns the formation is deviant for other reasons.

The first option (E1) is the most straightforward, because it seems to directly implicate a semantic incompatibility of a type that should be detectable. For example: with reference to studies of denominal verb formation of the relevant type, Chung follows earlier research in focusing on *concrete* nouns. The reason for this is that it is such nouns that can be interpreted as an instrument, locatum, or location when verbalized. In terms of the last section, if verbalization is impossible with an abstract noun, this can be understood as (i) $[\sqrt{\text{ROOT}} n]$ yielding only

abstract meanings for that Root, and (ii) $[[\sqrt{\text{ROOT}} n] v]$ not being able to construct instrument/locatum/location meanings from that.⁷

The second type of explanation is complicated, because it involves an interaction between objects generated by the grammar on the one hand with systems of use and interpretation on the other. Regarding this general line of research, there are two questions that I would like to put forth as topics for further work.

Question 1: Are the relevant (concrete noun) denominal verbs truly “ungrammatical”? Chung (2012: 36) says that Chamorro *baina* ‘sheath’ and *håyu* ‘stick’ are impossible as transitive verbs, period, even though they seem like they should form good location and instrument verbs respectively. It is surprising that these formations appear to be completely impossible as verbs, given that it seems possible to coerce at least one meaning for denominal verbs in English. So, for example, *cup the milk* may be deviant on the location reading, perhaps because there is no convention that associates a “canonical use” (Kiparsky 1997 and references cited there) of *cup* as a verb. Nevertheless, it does seem possible to coerce *cup* into a locatum reading: e.g., *We need to cup those tables before the guests come* = ‘put cups on those tables’.⁸

Summary/Program for Question 1: It would be mysterious if certain $[[\sqrt{\text{ROOT}} n] v]$ formations that are semantically appropriate (i.e., concrete nouns) were completely unacceptable. If the theory of the last section is correct, then the most straight-forward response to speakers’ negative reactions would be to say that the relevant objects are derived for the grammar, but are deviant for other reasons. One possible type of ‘other reason’ here would be the canonical uses mentioned earlier, although there are other possibilities in addition to this; and it remains to be seen how this can be investigated systematically.

Question 2: What are the limiting factors in $[[\sqrt{\text{ROOT}} x] y]$ formations and potentiation? (This question is motivated both by Chung’s observations, and a

⁷ It is probably more appropriate here to speak of the particular types of verbalization that give instrument, locatum, and location meanings; abstract nouns might yield other meanings when verbalized, e.g. *John pitied the opposition*.

⁸ Similarly, denominals that are strongly associated with one reading seem to be possible on others, e.g. those that involve Root-attachment of *v*. For example, *tape* and *chain* are examples that Kiparsky (1997) analyzes as “true” denominal instrument verbs, i.e. $[[\sqrt{\text{ROOT}} n] v]$, because the noun meaning must be present (e.g. *#They chained the prisoner with a rope*). Although it requires some semantic work, it seems possible to also get a locatum meaning for these same Roots: *John chained all of the outer doors yesterday* = ‘provided them with chains’; *Mary taped the desks* = ‘put a roll of tape on each desk’.

series of observations found in Lowenstamm 2010). Inspired by the considerations on “conversion” in Question 1, a similar question can be posed for cases with outer “category-changing” affixes that sound odd, in spite of relationships between the outer and inner affix. As noted by e.g. Baayen and Renouf (1996), the affix *-ity* is potentiated (= made productive) in the context of the *-able* affix that forms potential adjectives from verbs: *break*, *break-able*, *break-abil-ity*, etc.; see Embick and Marantz (2008) for analysis and implications for the theory of blocking. The Baayen and Renouf study also mentions adjectival *-al* as an affix that might potentiate *-ity*. At a first glance, there are several forms in English that suggest such a relationship between *-al* and *-ity*: e.g. *tribe/tribal/tribality*, *globe/global/globality*, *instrument/instrumental/instrumentality*, *periphery/peripheral/peripherality*, and so on. In these and other sets of forms, there are Root-nouns and adjectives, with a further “abstract noun” meaning “property of being ADJ” derived from the latter; e.g.:

- (4) a. *tribe*: [$\sqrt{\text{TRIBE}}$ [*n*,-Ø]]
 b. *tribal*: [$\sqrt{\text{TRIBE}}$ [*a*,-al]]
 c. *tribality*: [[$\sqrt{\text{TRIBE}}$ [*a*,-al]] [*n*,-ity]]

The question that is raised by these patterns is why *-al* adjectives on some other Roots produce *-ity* forms that are not entirely acceptable: e.g. *parent* and *parent-al* look very much like *tribe* and *tribal*; but *parent-al-ity* is quite odd (I will not use ‘*’ or other marks for reasons that should be clear). The same reaction arises (perhaps to different degrees) with *-ity* forms of other *-al* adjectives: e.g. *accident/accidental/accidentality*; *archive/archival/archivality*; *tube/tubal/tubality* etc. On the assumption that the second set of *-al-ity* forms are structurally the same as those in (4), the Root should not be visible for what *n* does, but there is an apparent “Root-specific” behavior.⁹ Thus, as with Question 1 it can be asked if the *al-ity* forms *parent-al-ity* etc. actually derived by the grammar. If so, are they odd for other reasons – e.g., no obvious “semantic space” for the *-ity* form, so that more coercion is required? Along the latter lines, there appears to be some improvement for *parentality* given enough context; e.g. *John’s tone in that paper was very parental*; → *The parentality of John’s tone in that paper raised some eyebrows*. Another possibility is that *parentality* might be more acceptable as a kind of technical term related to a certain type of parental behavior (an informal web

⁹ It is also the case that many words that happen to end in *al* take *-ity* (e.g., *banal/banal-ity*; for lack of a better term, this could be called *pseudo-potentialization*. I put this to the side here, since the main issues I wish to address concern words with real *-al* affixes.

search suggests this use). Taken together, these observations suggest that the oddness of *-al-ity* forms out of context might disappear when there is a clear semantic need for the *al-ity* form. But these are speculations at this point.

Summary/Program for Question 2: Overall, the cleanest hypothesis (I think this is similar to what Lowenstamm 2010 suggests as well for another set of affixes) is that all of the $[[\sqrt{\text{ROOT}} a] n]$ forms with *-ity* are derived by the grammar, but other factors associated with convention and use make some of them sound unacceptable out of context. As with Question 1, this hypothesis remains to be investigated systematically.

In summary, the general type of question raised in this section concerns the range of factors that are responsible for the acceptability of certain category-changing derivations. If the locality conditions discussed in §3 are correct, then there are some $[[\sqrt{\text{ROOT}} x] y]$ formations that are deviant (“lexical gaps”) in ways that cannot make direct reference to the Root (whether this occurs with “conversion” or with overt affixes). The hypothesis that is sketched above is that the relevant forms are grammatical (= derived by grammatical rules) but unacceptable for other reasons.

These considerations resonate with questions about productivity of rules (and whether words actually exist or not) of a type identified in Halle’s (1973) distinction between “potential” words (those derived by word formation rules) and “actual” words (those that actually occur in the language). Many examples that could be considered in this domain involve allomorphy for Root-attached morphemes: for example, the fact that we have *confuse/confus-ion*, but *refuse/refus-al* with *confus-al* and *refus-ion* being deviant (but perhaps potential, in Halle’s 1973 sense) forms. The points raised in this section suggest that similar considerations apply to at least some category-changing derivations as well (i.e. conversion is $[[\sqrt{\text{ROOT}} n] v]$; *-al-ity* is $[[\sqrt{\text{ROOT}} a] n]$).

An integrated approach to these observations would examine speakers’ responses (whether behavioral, neural, etc.) to e.g. *confusal* and *parentality* etc. to probe their status in the grammar; and, generalizing, seek ways to determine whether the grammar/use dichotomy appealed to above is on the right track.

5 Concluding remarks

The details of Chamorro ultimately play a secondary role in Chung’s paper (in spite of their inherent interest, and the elegant analyses that are extended to

them), because of the way her claims connect immediately with questions that have clear universal implications. The strength, precision and clarity of Chung's arguments make it possible to drive the discussion away from traditional questions about category, and towards the frontiers of research on features, morphemes, and their interactions in complex derivations. I hope that this commentary provides some further direction to the investigation of these issues.

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